

Remarks

Reconsideration of this Application is respectfully requested.

Upon entry of the foregoing amendment, claims 1 and 3-8 are pending in the application, with 1 being the independent claim. Claims 2 and 3 are sought to be cancelled without prejudice to or disclaimer of the subject matter therein. Claim 1 has been amended. Support for the amendment to Claim 1 can be found throughout the application, e.g., in cancelled claims 2 and 3, as well as in paragraph [0022]. Claims 4 and 6 have been amended to change their claim dependency. Claims 7 and 8 have been withdrawn from consideration. These changes are believed to introduce no new matter, and their entry is respectfully requested.

Based on the above amendment and the following remarks, Applicants respectfully request that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.

Response to Restriction Requirement

Applicants thank the Examiner for our telephone conference of July 5, 2007, wherein Applicants provisionally elected Group 1, as claimed by claims 1-6, in response to the Restriction Requirement. This election is made without traverse. Claims 7 and 8 have been withdrawn in this Amendment and Reply.

Rejection under 35 U.S.C. § 102(a) in view of Hanzawa *et al.*

Claims 1 and 5 were rejected under 35 U.S.C. §103(a) as allegedly being anticipated by Hanzawa *et al.* (U.S. Pub. No. 2001/0051258). Specifically, the Examiner

alleged that Hanzawa teaches a method of making an oxidation protective coating for carbon/carbon composites [0006] with: (a) Si impregnated into the carbon/carbon composite [0029, lines 4-6]; and (b) the carbon/carbon composite and Si heat treated [0068, line 1-3] to impregnate with molden silicon and form a Si-SiC material. Applicants respectfully traverse this rejection.

Under 35 U.S.C. § 102, a claim can only be anticipated if every element in the claim is expressly or inherently disclosed in a single prior art reference. *See Kalman v. Kimberly Clark Corp.*, 713 F.2d 760, 711 (Fed.Cir. 1983), cert. denied, 465 U.S. 1026 (1984).

Claim 1 of the present invention is directed to a method comprising (a) spraying a mixture of a vehicle liquid and Si powder on the carbon/carbon composite, (b) heating-treating to allow the carbon/carbon composite to be impregnated with the Si, thereby forming an SiC layer and an Si layer comprising a SiC layer and a Si layer, and (c) oxidizing the Si layer to form an SiO₂ film. Hanzawa discloses carbon/carbon composites that are placed in crucibles filled with Si powder [0112] and then heated. The carbon/carbon composites are not coated, but are rather submerged in the Si. The submersion described in Hawanza is a different than the claimed method of spraying a mixture of a vehicle liquid and Si powder on the carbon/carbon composites. The process of Hanzawa results in a composite material wherein "the content rate of silicon becomes higher according to the distance from the surface of the [composite] yarn." [0033]. *Thus, Hanzawa does not produce a SiC layer and a Si layer, but rather a single coating with a Si gradient.* Evidence of the bilayer coating of the present invention can be found in Figure 1, demonstrating the significance of the method of the present invention relative

to the method of Hanzawa. Thus, since each and every element is not present, the claimed invention is not anticipated by the Hanzawa. Claim 5 is dependent on claim 1, and thus is also not anticipated by the Hanzawa. Upon consideration of the above, Applicants respectfully request that the rejection under 35 U.S.C. § 102 with respect to Hanzawa be withdrawn.

Rejection under 35 U.S.C. § 103(a) in view of Hanzawa et al. and Holko

Claims 3 and 4 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Hanzawa *et al.* (U.S. Pub. No. 2001/0051258) in further view of Holko (U.S. Pat. No. 5,021,107). Specifically, the Examiner acknowledged that Hanzawa does not teach that the vehicle liquid used in facilitate the coating of Si on carbon/carbon composites is a volatile liquid. However, the Examiner alleged Holko teaches a volatile liquid such as alcohol can be used in coating the Si on the carbon/carbon composites.

To establish a *prima facie* case of obviousness, the art cited by the Examiner must (1) teach all of the claim limitations; (2) provide a suggestion or motivation to those of ordinary skill in the art to make the claimed composition; and (3) reveal that one of ordinary skill would have a reasonable expectation of success in doing so. *See In re Vaeck*, 20 USPQ2d 1438, 1442 (Fed. Cir. 1991); *see also* M.P.E.P. § 706.02(j). The United States Supreme Court, in *KSR International vs. Teleflex, Inc.*, 550 U.S. ___, WL 1237837 (April 30, 2007), further clarified the requirements for obviousness analysis under 35 U.S.C. 103(a). The Court noted that the analysis supporting a rejection under 35 U.S.C. 103(a) should be made *explicit*, and that it was "important to identify a reason

that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements" in the manner claimed. The Court specifically stated:

Often, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was *an apparent reason* to combine the known elements in the fashion claimed by the patent at issue. To facilitate review, *this analysis should be made explicit*. (KSR, slip opinion, page 14, *citing In Re Kahn*, 441 F. 3d 977,988 (CA, Fed. 2006) ([R]ejections on obviousness grounds *cannot be sustained by mere conclusory* statements, instead, there must be some articulated reasoning with some rational underpinning to support a legal conclusion of obviousness").

Claim 3 has been cancelled. Claim 4 depends from claim 1. As described above, Hanzawa does not provide a method comprising (a) spraying a mixture of a vehicle liquid and Si powder, (b) heating-treating to allow the carbon/carbon composite to be impregnated with the Si, thereby forming an SiC later and an Si layer comprising a SiC layer and a Si layer, and (c) oxidizing the Si layer to form an SiO₂ film. Holko describes a process for joining two carbon-carbon composites together, the composites being joined by a thin interlayer, wherein the interlayer can be sprayed on with a volatile carrier such as alcohol. The adhesive interlayer material can be selected from materials found in Table 1, none of which are Si. Thus, Holko does not teach the use of coating carbon-carbon composites with Si. Even if, *arguendo*, Si was used to coat in Holko, this method would not result in the bilayer structure featured in claim 1. Thus, since each and every element is not present, the claimed invention is not disclosed or suggested by Hanzawa or Holko, either individually or in combination. Upon consideration of the above, Applicants respectfully request that the rejections under 35 U.S.C. § 103(a) with respect to Hanzawa and Holko be withdrawn.

Rejection under 35 U.S.C. § 103(a) in view of Hanzawa et al. and Rousseau

Claims 2 and 6 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Hanzawa et al. in further view of Rousseau (U.S. Pat. No. 4,976,899). Specifically, the Examiner acknowledged that Hanzawa does not teach oxidizing the Si layer at a temperature of 400 °C to about 800 °C to form an SiO₂ film. However, the Examiner alleged that Rousseau teaches forming a protective SiO₂ coating on SiC coated carbon/carbon composites at a temperature of 600°C to about 1700°C.

Claim 2 has been abandoned. Claim 6 depends from claim 1. As described above, Hanzawa does not provide a method comprising (a) spraying a mixture of a vehicle liquid and Si powder, (b) heating-treating to allow the carbon/carbon composite to be impregnated with the Si, thereby forming an SiC later and an Si layer comprising a SiC layer and a Si layer, and (c) oxidizing the Si layer to form an SiO₂ film. Rousseau discloses "a silica coating (SiO₂) deposited on the surface and in the cracks of the SiC coating by vacuum impregnation in an alcoholic alkyl silicate solution and in particular ethyl polysilicate or ethyl orthosilicate." Col. 7, ll. 6-11. However, Rousseau does not disclose spraying on the mixture. Thus, in Rousseau, the SiO₂ is deposited onto a Si/carbon matrix in a separate step, it is not formed by oxidation. In claim 1 of the present invention, the Si layer *is oxidized to an SiO₂ layer*. Thus, since each and every element is not present, the claimed invention is not disclosed or suggested by Hanzawa or Rousseau, either individually or in combination. Upon consideration of the above, Applicants respectfully request that the rejections under 35 U.S.C. § 103(a) with respect to Hanzawa and Rousseau be withdrawn.

Double Patenting

The Examiner has provisionally rejected claims 1-6 on the ground of nonstatutory obviousness-type double patenting over claims 1-6 of copending U.S. Appl. No. 10/767,858. Claims 2 and 3 have been cancelled. Applicants respectfully traverse these rejections for nonstatutory obviousness-type double patenting, but nevertheless request that they be held in abeyance until the remaining issues outstanding in this application have been resolved.

Conclusion

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully
requested.

Respectfully submitted,

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